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ABSTRACTS

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Artifacts in Staining of Tubercle Bacilli.—Evidence is presented to show that the mechanical action of the platinum loop in making smears and of the microtome knife in cutting sections of colonies is sufficient to create non-acid-fast rods and granules. It is not assumed that these observations will refute the existence of some pleomorphism in the reproduction and growth of the tubercle bacillus. There is abundant evidence that, under certain conditions, granular forms and non-acid-fast or weakly acid-fast cells do occur. It is to be emphasized instead that great care should be exercised in the interpretation of stained materials, and especially in the use of staining procedures as measures of experimental results. A large number of films of young growths of *Mycobacterium tuberculosis*, strain H37, prepared without the traumatizing action of a platinum loop or spatula show no non-acid-fast free granules (small or large) or thin rods (long or short). The same results were obtained with *Mycobacterium tuberculosis* H39 RV; *M. tuberculosis* bovine and avian type; *M. phlei*, *M. smegmatis*; *M. ranae* and certain unidentified, nonpathogenic acid-fast organisms isolated from gastric lavage. Films made by spreading the microörganisms as gently as possible with a platinum loop revealed myriads of non-acid-fast granules both large and small, also faintly stained slender non-acid-fast rods of varying sizes which in some cases are attached to granules, non-acid-fast bacilli with deeply stained terminal bodies, and finally typical acid-fast organisms. The percentage of non-acid-fast forms present was found to be roughly proportional to the effort expended with the platinum loop in making the film. The instrument used for spreading the bacteria was varied with no appreciable difference in results. The cells of older cultures were found to possess a greater resistance to mechanical destruction. In preparations made from thirty-day old cultures of H37 and H37 RV only a few non-acid-fast granules and rods were in evidence, constituting not more than 10 per cent of the total. Sectioning of embedded organisms may also destroy acid-fastness, the non-acid-fast forms are found to be more abundant where distortion of the paraffin is greatest, especially along the marks of nicks or dull places in the knife and the proportion of atypical forms appears to be greater in thin than in thick sections. Sectioning and smearing the cultures produce parallel results, both procedures yielding a greater proportion of non-acid-fast forms from young material. Why the cells from old and young cultures should thus differ is not clear. It could conceivably depend on a differentiated cell wall that might gain in thickness and rigidity as the cell decreases its rate of division and increases in age. The demonstration of the artifact nature of these non-acid-fast fine rods and granules renews interest in the occurrence of similar forms in young microcultures as reported by Kahn. Possibly they do occur, or possibly, as proposed by Oerskov, they are the result of degeneration and crystal formation. It is certain, however, that no support for the existence of such forms in a reproductive cycle can be derived from stained smears or sections of cultures of any age.—*Some Artifacts Encountered in Stained Prep-*

arations of Tubercle Bacilli: I. Non-Acid-Fast Forms Arising from Mechanical Treatment, D. Yegian & K. R. Porter, J. Bact., July, 1944, 48: 83.—(F. G. Petrik)

Cultivation of Tubercle Bacilli.—Comparisons made with Corper's egg-yolk medium without dye or glycerin, Corper's medium with malachite green oxalate and no glycerin, Corper's medium with glycerin and malachite green oxalate, Hohn's medium with and without glycerin and Petragnani's medium, show that Corper's medium was more liable to the growth of contaminants than was Hohn's medium, although it was as efficient for growing small inocula of human type tubercle bacilli. Hohn's medium containing glycerin and dye and at pH 7.0 seems to be the one of choice for routine cultivation of clinical specimens. It is efficient, resists contaminations and provides a good background for early identification of growth of tubercle bacilli. Bovine tubercle bacilli probably would not grow if small numbers were planted on Hohn's medium with glycerin since they do not grow from small inocula on other egg media containing glycerin. The colonies of human tubercle bacilli on Hohn's medium without glycerin are so small, it would not be practicable to use this medium alone for routine clinical work. Possibly some substance could be added to Hohn's medium without glycerin to make it more suitable for growing human tubercle bacilli. Nassau's "blood charcoal" should be investigated for this purpose. It is suggested that one culture medium which is both efficient and dependable would be adequate, provided the clinical specimens are cultured at least in duplicate.—*Cultivation of Human Tubercle Bacilli on Egg Mediums, D. M. Powelson & J. R. McCarter, J. Infect. Dis., July–August, 1944, 75: 95.—(F. G. Petrik)*

Cultivation of Tubercle Bacilli.—Comparative cultural studies were made, using the culture medium introduced by Hohn in 1940 and Löwenstein's egg-medium; 52 sputum specimens, negative on smear, and 53 positive sputum specimens were cultured on both media. Of the former, 14 positive cultures were obtained on Hohn's and 8 on Löwenstein's medium. The colonies grow faster and are larger on Hohn's medium. The preparation of Hohn's medium is simpler, because the basic mixture can be kept longer in a sterile state. (Lockemann's solution, containing glycerin, 2.7 per cent, with alanin instead of asparagin.)— *Versuche zur Kultur von Tuberkelbacillen auf festen Nährboden, H. Northoff, Diss., 1940.—(G. Simmons)*

Tubercle Bacilli in Feces.—The method for the culture of tubercle bacilli from the feces used in the present study was developed by the author some time ago and is not described in the present paper. Although the number of cases studied is small and the results, therefore, not quite conclusive, it seems that with the method advocated more positive results were obtained than with laryngeal swab, gastric lavage etc. This method is important for the study of intestinal tuberculosis too, because it allows the differentiation of non-tuberculous acid-fast rods of the intestinal flora from true tubercle bacilli.—*Über den klinischen Wert des Stuhlnachweises von Tuberkelbacillen im Verlauf der Lungentuberkulose. Ergebnisse eines neuen Untersuchungsverfahrens, J. E. Wolf, Deutsche med. Wchnschr., 1942, 1: 653.—(G. Simmons)*

Culture Medium for Tubercle Bacilli.—The new medium suggested consists of eggs, potatoes, tomato salad, human plasma and gentian violet. To this mixture an equal amount of a mixture containing asparagin, glycerin, magnesium sulfate, potassium phosphate, calcium phosphate, sodium citrate and ammoniated iron citrate is added. Growth of tubercle bacilli occurs more readily and faster than on the media of Corper-Uei, Hohn, Petragnani and Löwenstein. The inoculation into guinea pigs is still superior to any culture method if the bacilli are virulent. When the virulence is decreased, however, cultures may be positive where the inoculation remains negative. The time when the inoculated animal is sacrificed

is important, because the result may be negative when the animal is sacrificed too early or too late (healing).—*Ein neuer Nährboden zur Schnellkultur des M. tuberculosis. Verschiedenes Verhalten desselben gegenüber den Isolierungs-Nährböden, O. A. Gimeno, Rev. espan. de tuberc., 1941, 10: 447.*—(*G. Simmons*)

Demonstration of Tubercle Bacilli.—The following material was examined for the presence of tubercle bacilli: 753 sputum specimens, 104 urines, 91 specimens of pus and pleural fluid, 29 spinal fluids, 12 stools, 11 gastric contents. Inoculation into a guinea pig was performed when direct studies were not conclusive. Of the 1,000 examinations, 220, or 22 per cent, were positive with all methods; 175 examinations, or 17.5 per cent, were positive on simple microscopic study. Of 242 animal inoculations, 31, or 14.5 per cent, were positive. Broken down, the results are as follows:

Sputum: 753 specimens,
216, or 28.7 per cent, positive with all methods
125, or 16.6 per cent, positive on smear
79, or 12.1 per cent, positive on concentration
Inoculation was done in 103 specimens, 12 gave positive results.
Pus and pleural fluid: 91 specimens,
24, or 27.9 per cent, positive with all methods
8, or 8.9 per cent, positive on smear
16 positive on guinea pig inoculation.
Urine: 104 specimens, 8 positive, 4 on smear and 4 in the guinea pig
Spinal fluid: 29, one positive on smear and one in guinea pig
Gastric content: 11, 3 positive (28 per cent), 2 on smear and one in the animal
Feces: only one positive in the guinea pig.—*Résultats comparés de la recherche du bacille de Koch par les méthodes de laboratoire dans 1,000 produits pathologiques présumés tuberculeux, P. Haudurov, Rev. méd. de la Suisse Rom., 1942, 62: 475.*—(*G. Simmons*)

Growth of Tubercle Bacilli in Blood.—Due to different techniques used, attempts to kill tubercle bacilli or to make them less active by means of human or animal blood or its constituents have remained inconclusive so far. It seems, however, that blood taken from a tuberculous individual has a greater bacteriostatic property than that from a normal individual. The experiments were repeated: 0.9 cc. of inactivated rabbit serum was mixed with 0.1 cc. of a bacillary suspension, containing 0.001 to 0.01 mg. of bacilli. The serum acts most favorably on the growth of tubercle bacilli if it is diluted with broth (1:2 or 1:4). The optimum pH for the human strain was 6.5–7.0, whereas germs of the Arloing strain still grow at a pH 6.0–8.5. One day old, not heated guinea pig serum acts more favorably on the growth than serum twenty-one days old. Growth in whole-blood taken from guinea pigs occurs more readily in the thermostat than in the refrigerator. The bacilli grow faster and more regularly in whole blood taken from rabbits or guinea pigs than in the serum prepared from the same bloods. As far as growth is concerned, there is no difference between the blood obtained from rabbits and that obtained from guinea pigs, and it is concluded that the fact that rabbits show greater resistance toward the human tubercle bacillus than guinea pigs cannot be explained on the basis of the existence of protecting substances in the blood of rabbits. Human tubercle bacilli grow better in the blood of healthy guinea pigs than in that obtained from tuberculous animals. Similar experiments with rabbit blood were not conclusive. There is no difference in the growth of the human and the bovine type bacillus in the same rabbit blood.—*Untersuchungen über die Bedingungen des Wachstums von Tuberkelbacillen in tierischem Blut und über entwicklungshermmende Stoffe im Tierblut, H. Hiroki, Beitr. z. Klin. d. Tuberk., 1942, 97: 664.*—(*G. Simmons*)

Serum Albumin, Food for Tubercle Bacilli.—In the course of studies on the cultivation of minute inocula of tubercle bacilli it was found

that Dorset's synthetic medium with 0.5 per cent human serum albumin performed as efficiently as Corper's egg-yolk medium. Because of its physical and nutritive properties, this serum albumin medium should be an excellent plating medium for research in which the estimation of numbers of viable tubercle bacilli is essential. Growth on the serum albumin media was apparent first in the liquid at the base of the slants and colonies appeared on the slants three to four days later. Growth from 10^{-7} mg. of human type of tubercle bacilli occurred in the 0.05 per cent, 0.1 per cent and 0.5 per cent albumin media and in Corper's medium, and no growth appeared on Dorset's synthetic medium without albumin from the heaviest inoculum. Serum albumin in a concentration of 0.5 per cent stimulated the same amount and rapidity of growth as Corper's egg-yolk medium. The addition of serum albumin to a liquid medium would probably also allow the growth of single cells of human tubercle bacilli.—*Serum Albumin as a Food for Human Tubercle Bacilli, D. M. Powelson & J. R. McCarter, J. Bact., September, 1944, 48: 479.*—(*F. G. Petrik*)

Fluorescence Microscopy.—This method was found superior in a controlled experiment involving the examination of 300 sputum specimens for tubercle bacilli. Forty-five positive slides were found by this method, as compared to 36 found by the Ziehl-Neelsen technique. Reëxamination of the Ziehl-Neelsen slides demonstrated 3 more positive, and preparation of new slides from the same cases added another 3 positive ones to the Ziehl-Neelsen stained slides, bringing the total positive specimens by the Ziehl-Neelsen stain up to 42. However, slides examined by fluorescence microscopy are examined for six minutes, whereas slides stained by the Ziehl-Neelsen technique are examined for at least fifteen minutes. The saving in time is explained by the fact that there is more contrast between bacilli and background with the auramine-phenol stain when examined with fluorescent microscopy and also, because this is so, a larger objective can successfully be used and a larger portion of the smear can be examined at one time. Oil immersion is never used for the detection of bacilli by this method. Although this method of examining specimens would seem advantageous for laboratories in which large numbers of sputum specimens are to be examined, a complete switch-over is not advised before parallel experiments have been run. A short experiment such as described in this paper will prove very convincing to all laboratory workers.—*Fluorescence Microscopy in the Detection of Tubercle Bacilli, H. Lempert, Lancet, December 23, 1944, 247: 818.*—(*H. Marcus*)

Subsurface Growth of Tubercle Bacilli.—Suspensions of five virulent strains of *Mycobacterium tuberculosis*, when well dispersed and inoculated into a synthetic medium in amounts of 1 mg. to 10 cc. medium, showed increased turbidity within two days. One avirulent rapidly growing strain grew in a similar manner.—*Subsurface Growth of Virulent Human Tubercle Bacilli in a Synthetic Medium, G. P. Youmans, Proc. Soc. Exper. Biol. & Med., October, 1944, 57: 122.*—(*F. B. Seibert*)

Infectivity of Mycobacteria.—The results of the implantation of measured doses of 49 strains or species of mycobacteria on the chorioallantoic membranes of chick embryos are given. Organisms of the highest virulence for guinea pigs consistently produce extensive large characteristic lesions in the mesoderm of the chorioallantois, with rapid growth of the bacilli. The character of the lesions differs according to the type of organism, the avian and bovine tubercle bacilli producing a lesion histologically distinct from those caused by human tubercle bacilli of the highest guinea pig virulence. The chorioallantois of the chick embryo varies too greatly in its response to avirulent acid-fast bacilli to make the procedure by itself of value in the determination of the virulence of a given strain or species of organism. The response of the chorioallantois is constant for a given strain or species of organism; variations are chiefly in

degree in individual eggs, not in type or overall extent of the lesions produced. Small doses of bacilli, .01 mg. or less, are by themselves inadequate to show characteristic changes in the membranes routinely. (Authors' Summary.)—*The Infectivity of Mycobacteria for Chorioallantoic Membranes of Chick Embryos, G. L. Fite & B. J. Olson, Pub. Health Rep., November 3, 1944, 59: 1423.*—(*P. Lowy*)

Atypical Acid-fast Microörganisms.—A qualitative study of the nucleic acid extracted from ten strains of atypical acid-fast bacilli (nonpathogenic for guinea pigs) isolated from sputum and gastric contents of patients with proved or suspected tuberculosis, using Dische's diphenylamine reagents for thymus nucleic acid, indicates that the nucleic acid of four strains consists largely of desoxyribonucleic acid. The material from two other strains gave less color with the reagent, perhaps because of the dilution of the nucleic acid by impurities. It may be, however, that the nucleic acid content of these organisms is a mixture of desoxyribonucleic acid and ribonucleic acid similar to that of *Corynebacterium diphtheriae* which contains both uracil and thymine and is either a mixture of plant and animal types or a new type. No blue color was obtained with the material from the remaining four strains, indicating the absence or a low content of desoxyribonucleic acid. It would appear that any classification suggested for this varied group of microörganisms should include a determination of the nucleic acid content. This work is being continued, employing larger quantities of material to determine quantitatively the types of nucleic acid present.—*Atypical Acid-fast Microörganisms: I. Nucleic Acid Fraction, F. G. Petrik, J. Bact., September, 1944, 48: 347.*—(*F. G. Petrik*)

Enzymes in Tuberculous Pus.—The glycolytic activity of tuberculous pus is considerable and can destroy 25 per cent of the glucose present. This enzyme originates not only in the leucocytes but also in the plasma. The amylolytic action of the pus is due to the diastase of the leucocytes. The proteolytic enzymes come mainly from lymphocytes.—*Di alcune azioni enzimatiche contenute nel pus tubercolare, A. Spandonari, Arch. méd. e. chir., 1942, 11: 189.*—(*G. Simmons*)

Pigment Formed from p-Aminobenzoic Acid by Tubercle Bacilli.—It was previously reported that a particular strain of *M. tuberculosis* forms a bright yellow pigment when grown in the presence of p-aminobenzoic acid (Paba). The color of the pigment fades after 10 to 21 days and the mass of bacilli grows darker. Compact masses of green-yellow, very shiny substances which are surrounded by groups of bacilli become visible under the microscope. The light-refraction of these yellow masses suggests that they may be crystalline, but no definite crystals could be identified. No pigment can be detected inside the bacilli. The present sutdy deals with the conditions of this pigment formation. It has been established that magnesium is essential for the growth of *M. tuberculosis*. No pigment or very little pigment is formed when less than 0.05 per cent or more than 0.5 per cent magnesium sulfate is present; the optimal stimulating effect for pigment formation is reached at a concentration of 0.5 per cent. The pigment began to appear with concentrations of 100 gamma $FeCl_3$ per 100 ml.; the production of pigment was slight with 250 gamma per 100 ml., but increased to the usual amount with 500 gamma per 100 ml. When glycerol was replaced by glucose in Long's medium, the formation of yellow pigment was suppressed. If both glucose and glycerol were present, the pigment was formed as usual but to a lesser degree than in a medium which contained only glycerol. Studies made with buffered media show that glucose inhibits the appearance of the pigment through other mechanisms than the formation of acid. As glucose is a reducing agent, sodium ascorbate was added to determine whether it would have a similar effect. The formation of yellow pigment is completely suppressed. The optimal pH for the pigment formation lies near

pH 6; at pH 7.8 none is produced. The addition of riboflavin, pantothenic acid, thiamine and nicotinic acid did not change the appearance of yellow pigment formation. Sodium cyanide concentrations as low as 0.0005 M reduced the amount of pigment to as little as one-third of the usual amount. Young cultures acquire the ability to produce the yellow pigment after 3 to 4 days of growth but cultures cease to produce the pigment after 15 to 20 days. The same coloration is produced in the presence of procaine, other derivatives of Paba give no pigment, probably because their high bacteriostatic activity prevented the use of suitable concentrations. The pigment is practically insoluble in water, ether, chloroform and petroleum ether, but highly soluble in concentrated acetic acid and 88 per cent phenol. It is quickly decolorized in pyridine and when heated with acids or alkali. The yellow pigment contains oxidized NH_2 groups. Its chemical properties seem to show that it is, or contains, an unstable oxidation product of Paba and is formed from Paba by an enzyme which seems to be a specific oxidase.—*A Yellow Pigment Formed from p-Aminobenzoic Acid by Mycobacterium Tuberculosis Var. Hominis, R. L. Mayer, J. Bact., September, 1944, 48: 337.*—(*F. G. Petrik*)

Dextrorotatory Fatty Acids in Tubercle Bacilli.—By repeated fractionations of the methyl esters four different acids were isolated which differed in specific optical rotation and in molecular weight. The purified acids corresponded to the formulas $C_{24}H_{48}O_2$, $C_{25}H_{50}O_2$, $C_{26}H_{52}O_2$ and $C_{27}H_{54}O_2$. The properties of the acid having the formula $C_{26}H_{52}O_2$ agree with those reported for phthioic acid.—*Chemistry of the Lipids of Tubercle Bacilli. LXX. The Dextrorotatory Fatty Acids of the Acetone-Soluble Fat of Cell Residues from the Preparation of Tuberculin, L. G. Ginger & R. J. Anderson, J. Biol. Chem., December, 1944, 156: 443.*—(*F. B. Seibert*)

Methyl Groups in Branched Chain Fatty Acids.—Application of the Kuhn-Roth method for the determination of methyl groups attached to carbon, on the acetone-soluble fat of tuberculin residues, indicated that these acids contain doubly branched chains.—*The Chemistry of the Lipids of Tubercle Bacilli. LXXI. The Determination of Terminal Methyl Groups in Branched Chain Fatty Acids, L. G. Ginger, J. Biol. Chem., December, 1944, 156: 453.*—(*F. B. Seibert*)

Mycocerosic Acid.—The normal fatty acids found in the wax isolated from tubercle bacilli residues from the preparation of the purified protein derivative PPD were palmitic, stearic, and hexacosanoic acids and an unsaturated acid probably oleic acid. The branched-chain fatty acids giving ether-soluble lead salts were separated into tuberculostearic acid, dextrorotatory acids analogous to phthioic acid, and a levorotatory acid, for which the name "mycocerosic" acid is proposed. This acid has been found to be a characteristic constituent of all the wax fractions of the human tubercle bacillus and it is obtained as a noncrystalline waxy solid, m.p. 27–28°, $[\alpha]_D$ in $CHCl_3$ −5 to −6°. Its composition corresponds to the formula $C_{30}H_{60}O_2$.—*The Chemistry of the Lipids of Tubercle Bacilli. LXXII. Fatty Acids Occurring in the Wax Prepared from Tuberculin Residues. Mycocerosic Acid, L. G. Ginger & R. J. Anderson, J. Biol. Chem., January, 1945, 157: 203.*—(*F. B. Seibert*)

Phthiocerol.—Evidence is presented which indicates that phthiocerol is a homogeneous substance and that its formula is either $C_{34}H_{67}(OH)_2OCH_3$ or $C_{35}H_{69}(OH)_2OCH_3$. Phthiocerane, the hydrocarbon prepared from phthiocerol by reduction of the iodo derivative, has been obtained in very pure form. It crystallizes in rosettes of fine needles and melts at 59 to 60°. Its formula is either $C_{34}H_{70}$ or $C_{35}H_{72}$. Its low melting point and high solubility would indicate that it has a branched chain structure. A new branched chain hydrocarbon 9,26-dimethyltetratricontane, $CH_3(CH_2)_7CH(CH_2)_{16}CH(CH_2)_7CH_3$ has been

$$\begin{matrix} & | & & | & \\ & CH_3 & & CH_3 & \end{matrix}$$

synthesized by electrolysis of tuberculostearic

acid and some of its properties have been determined.—*The Chemistry of the Lipids of Tubercle Bacilli. LXXIII. Studies on Phthiocerol, L. G. Ginger & R. J. Anderson, J. Biol. Chem., January, 1945, 157: 213.*—(*F. B. Seibert*)

Carotin in Pulmonary Tuberculous Foci.—In lungs containing extensive caseous processes, particular yellow foci, constituted by accumulation of carotin pigment, may be encountered. The skin of patients with such pulmonary findings is slightly yellow, pseudoicteric. This pigment is contained in the alveolar endothelium in form of small drops or a diffuse discoloration. Whereas in other forms of hypercarotinemia, for example, in disturbances of the vitamin A metabolism, the cause is to be seen in a hepatic dysfunction; in the case of these pulmonary accumulations of carotin the author thinks that they are due to disturbances of respiration. Anoxia makes oxidation and destruction of the carotin impossible. Microscopically two forms of these carotinoid acino-lobular foci exist: (*1*) desquamative alveolitis, in which desquamated cells are filled with the pigment; (*2*) reticulofibrosis of the alveolar septa with proliferation of the alveolar endothelium toward the lumen. The insufficient gaseous exchange facilitates the precipitation of the pigment.—*Über eigenartige gelbe carotinoide Herde bei der Lungentuberkulose. Die pathogenetische Deutung der Hypercarotinaemie und der Dyspnoe ohne oder mit maessiger Cyanose der Tuberkulosekranken, C. Manzini, Ztschr. f. Tuberk., 1942, 89: 21.*—(*G. Simmons*)

Diasone in Guinea Pig Tuberculosis.—The effect of diasone was studied in guinea pigs with primary infection (Group A) and guinea pigs with reinfection tuberculosis (group B). Group A consisted of 18 animals which were infected by intramuscular injection of 0.1 mg. of human tubercle bacilli. Six animals served as controls (group 1), 6 were treated from the moment of inoculation (group 2), in 6 the treatment was started two weeks after the inoculation (group 3). The treatment consisted in oral administration of 150 mg. diasone, twice daily. The animals were killed two weeks, one month, one and a half months, two months, three months and four months after the inoculation. The control animals (group 1) showed rapidly developing tuberculosis of all organs with caseation; group 2 showed hardly any lesions in the organs, even four months after inoculation; in group 3, liver and spleen were affected two weeks after inoculation, but then the disease did not progress. Group B consisted of 17 guinea pigs which received a subcutaneous injection of 1 mg. BCG. One month later all animals reacted to intracutaneous tuberculin tests. One month after the injection of BCG the animals received intratracheally 0.1 mg. of human tubercle bacilli. Six animals served as controls (group 1), in 6 the treatment was started two weeks before the intratracheal infection (group 2), and in 5 the treatment was started two weeks after the intratracheal infection (group 3). The treatment was the same as in the primary infection group, and the animals were killed in the same intervals. Group 2 showed slower development of tuberculosis in lungs and other organs than the control group 1; in group 3 the diasone did not affect the development of the pulmonary lesions, but appeared to retard the development of tuberculosis in other organs. The average level of diasone in the blood was 3.0 mg. per cent, in the urine 81.0 mg. per cent. The only toxic effects were blood stasis in the spleen and hypertrophy of its reticuloendothelial tissue.—*Traitement de la tuberculose expérimentale du cobaye par la "diasone": 1. Primo-infection; 2. Reinfection, M. Giroux, Laval méd., December, 1944, 9: 788.*—(*G. C. Leiner*)

Sulfanilamide and Tubercle Bacilli.—Previous studies demonstrated that when a certain strain of *Mycobacterium tuberculosis* is cultured in Long's medium containing p-aminobenzoic acid (PABA) a yellow pigment is produced. The present study is concerned with the effect of sulfanilamide upon this same reaction. The organisms were grown in 18 mm. test tubes containing 10 ml. of Long's synthetic medium at 37°C. under the following sets of

conditions: (*1*) as control, and with the addition, before sterilization, of varying concentrations of (*2*) sulfanilamide, (*3*) PABA, (*4*) PABA plus sulfanilamide, (*5*) procaine and (*6*) procaine with sulfanilamide. The results show that the yellow pigment is produced regularly in the cultures containing PABA in concentrations of 1:750 and 1:5000. Sulfanilamide was capable in some cases of completely suppressing pigment formation in the tubes to which PABA had been added in dilutions of 1:2000 to 4000. On the other hand, a higher concentration of PABA, such as 1:1000, appreciably attentuated the inhibiting effect of sulfanilamide. To explain this inhibitory effect, the hypothesis of a direct chemical reaction between the oxidation products of PABA and sulfanilamide is propounded and discussed.—*The Influence of Sulfanilamide upon the Yellow Pigment Formed by Mycobacterium Tuberculosis from p-Aminobenzoic Acid, R. L. Mayer, J. Bact., July, 1944, 48: 93.*—(*F. G. Petrik*)

Chemotherapy with Amido-compounds of α-Furancarbonic Acid.—The evaluation of a specific chemotherapeutic agent can be based up to a certain extent on the changes produced by it on the vitality of tubercle bacilli *in vivo*. The present study was based on the following method: the infectious agent was a tubercle bacillus of the human type, growing rapidly *in vitro*, and having conserved its virulence for guinea pigs, rabbits and mice. The experimental animal was the white mouse. The intravenous route of infection was used. The dose of infection was 0.5 mg. of a two-week old culture. The chemotherapeutic products were injected intramuscularly in oily suspension, the dose being somewhat below the maximal. Ten injections were given within two weeks. The evaluation of the results was as follows: suspensions of parenchymatous organs of 30 tuberculous white mice were cultured on Löwenstein's medium, 15 mice having received the chemotherapeutic agent and 15 serving as controls. The frequency of positive and negative cultures obtained from treated and control animals was compared. The authors have studied the chemotherapeutic properties of amido-compounds other than the sulfonamides and not containing sulfur. The investigated substances were amido-compounds of α-furancarbonic acid differing in the presence of the following groups: butyl, iso-butyl, heptyl, dimethyl, dipropyl, dibutyl, di-isobutyl, benzyl, methyl-benzyl, propyl-benzyl, iso-butylbenzyl, dibenzyl, anilid. Of these investigated compounds the benzylamid of α-furancarbonic acid showed the most pronounced activity in animals and appeared to be of low toxicity. Its administration in tuberculous mice resulted in a negative culture from their organs in 45 per cent of cases, whereas negative cultures with other amido-compounds were only found in 11 to 38 per cent of cases. These products were also studied in reference to their properties *in vitro* and also here the benzyl compound showed the most marked bactericidal and bacteriostatic effect.—*Investigations on the Chemotherapeutic Properties of Some Amido-compounds of α-Furancarbonic Acid in Tuberculosis, F. L. Chpanir & E. I. Chertkowa, Probl. tuberk., 1944, 4: 9.*—(*V. K. Leites*)

Method of Testing Bacteriostatic Agents on Tubercle Bacilli.—Tubes containing 10 cc. of a synthetic medium were inoculated with dilutions of a suspension of tubercle bacilli and surface and subsurface growths recorded at seven days for the avirulent human strain 607 and at twenty-one days for the virulent strain H37Rv. The order of effectiveness of four compounds in inhibiting the growth of the avirulent strain was found to be: sulfathiazole, sulfadiazine, 4,4′diaminodiphenylsulfone and sulfanilamide. For the virulent strain it was found to be: 4,4′diaminodiphenylsulfone, sulfathiazole, sulfadiazine and sulfanilamide.—*An Improved Method for Testing the Bacteriostatic Agents Using Virulent Human Type Tubercle Bacilli, G. P. Youmans, Proc. Soc. Exper. Biol. & Med., October, 1944, 57: 119.*—(*F. B. Seibert*)

Inhibitory Action of Tuberculo-carbohydrate and Phosphatide.—The carbohydrate

and phosphatide fractions of the tubercle bacillus exert a selective inhibitory action upon the endocellular enzyme, Cathepsin II, of tuberculous tissue. The carbohydrate caused no inhibition whatever upon normal liver cathepsin, while the phosphatide caused some inhibition but less than on the proteinases prepared from tuberculous tissues. This phenomenon may help to explain the cytotoxic action of tuberculin *in vitro* and also the failure of autolysis of caseous, tuberculous tissue.—*Inflammation. VII. Selective Inhibitory Action of Tuberculo-Carbohydrate and Phosphatide on Cellular Cathepsins from Tuberculous Tissues, C. Weiss & Nellie Halliday, Proc. Soc. Exper. Biol. & Med., December, 1944, 57: 299.—(F. B. Seibert)*

Bacteriostatic Property of Culture Filtrates.—The growth of the tubercle bacillus is inhibited by the filtrate of a liquid culture medium, which previously had been used for the culture of acid-fast tuberculosis and nontuberculosis bacilli. On the other hand, the filtrate of a tuberculosis culture favors the growth of some acid-fast nontuberculosis bacilli.—*Presenza di proprietà attivanti o inibenti nei terreni liquidi che sono serviti allo sviluppo di bacilli acido-resistenti tubercolari e non-tubercolari, S. Savarino & D. Oricchio, Ann. Ist. Carlo Forlanini, 1943, 7: 408.—(G. Simmons)*

Tuberculostatic Action of Phenothiazine.—Phenothiazine dissolved in propylene glycol inhibited the growth of tubercle bacilli *in vitro* in high dilutions. In the presence of serum the bacteriostatic effect was diminished, but was still significant. Oxidized forms of phenothiazine showed moderate inhibition of growth. Other derivatives exhibited low tuberculostatic action.—*Tuberculostatic Action of Phenothiazine and Derivatives, B. L. Freedlander, Proc. Soc. Exper. Biol. & Med., October, 1944, 57: 106.—(F. B. Seibert)*

Antibacterial Effects on Tubercle Bacilli.—A number of organic substances, straight chain, cyclic and straight chain combined with cyclic were added to Long's liquid synthetic medium to determine the approximate amount necessary to prevent the growth of the H37 strain of human tubercle bacilli. The amount of bacilli planted was 10^{-3} (about 10^6 bacilli). The method of dispersing and planting was that described by Drea with the exception that 10^{-1} per cent sodium hydroxide in distilled water was used to disperse the bacilli and prepare the first suspension of 1 mg./ml. The glassware was very clean and cotton stoppers were not used, the flasks were capped with loosely fitting aluminum caps or closely wrapped, thin aluminum foil. Growth always occurred first at the bottom of the liquid medium and, when the inhibiting agent was not too effective, extended to the surface of the medium. The appearance of the bottom growth was sufficient to justify a positive finding. Failure to observe a bottom growth was recorded as a complete inhibition of growth. The pronounced growth-inhibiting properties of C_{12}, C_{14} and C_{16} chain aliphatic bases are again emphasized. This is true for the simple compounds themselves, or when they are joined to or combined with radicals or other molecules such as benzene derivatives. The simpler benzene derivatives tested had the same relatively weak growth-preventing power of C_6 or C_7 straight chain acids. One exception was catechol with OH groups in the 1,2 positions which inhibited at 10^{-2} per cent concentrations. Sulfanilamide had its low antibacterial power increased by substitution into its moledule of either the pyrimidine or the thiazole nucleus. Morpholine, a saturated ring with 1 NH group and 1 O atom had no antibacterial power. It is suggested that rearrangements of certain molecules might result in increase of antibacterial powers. One of these is merthiolate, where the substitution of some other element such as Cd or Mn for Hg may be advantageous. Or, perhaps, the addition of a C_6 or longer aliphatic chain to the merthiolate molecule (modified or not, as before suggested) at the 4 position would be helpful. The possible applications for chemotherapeutic purposes are obvious since bacteriostatic powers are or may be quite as

important as bactericidal powers in such efforts.—*Antibacterial Effects of Various Organic Substances upon the H37 Strain of Human Tubercle Bacilli in a Simple Synthetic Medium, W. F. Drea, J. Bact., November, 1944, 48: 547.*—(*F. G. Petrik*)

Inhibition of Mycobacterium by Streptothricin.—Streptothricin in amounts of 0.1 to 1.0 unit per ml. inhibited the growth of five mycobacterium strains on nutrient broth or Long's medium. It was found to be definitely bactericidal.—*In Vitro Inhibition of Mycobacteria by Streptothricin, H. B. Woodruff & H. W. Foster, Proc. Soc. Exper. Biol. & Med., October, 1944, 57: 88.*—(*F. B. Seibert*)

Effect of Antibiotics on Tubercle Bacilli.—Numerous antibiotic substances had bacteriostatic activity for *Mycobacterium tuberculosis* which differed according to the species or even strains of the same species. Of these substances streptomycin was the most promising for practical utilization because of its relatively low toxicity. The addition of 200 to 300 units of streptomycin per 1 ml. of medium in which living cells of the tubercle bacilli were suspended, was sufficient to kill the cells within a period of a few days. Smaller amounts brought about death if a long period, ten days, of incubation was allowed.—*Effect of Streptomycin and other Antibiotic Substances upon Mycobacterium Tuberculosis and Related Organisms, A. Schatz & S. A. Waksman, Proc. Soc. Exper. Biol. & Med., November, 1944, 57: 244.*—(*F. B. Seibert*)

Seasonal Tuberculin Allergy.—The study by Gomez and Epifanio (ibid. 1942, p. 269) on monthly and seasonal variations of tuberculin sensitivity is quoted and their findings of increased sensitivity early in summer and winter noted. The present authors tested 48,115 persons in Asuncion, Paraguay during 1941, 1942 and 1943. Persons were tested but once, and ages, sex and race are not given. Lowered sensitivity was found in autumn and spring of 1942, winter of 1941 and 1943. Heightened sensitivity was found in November and December of 1942 and December, 1943. A future paper will deal with some of the climatic factors, such as atmospheric pressure, humidity, temperature, that the authors think might be responsible for this change in allergy.—*La Allergia tuberculinica en relacion a las distintas epocas del año, A. R. Gines & A. Wasmosi, Hoja tisiol., June, 1944, 4: 93.*—(*J. S. Peterson*)

Histamine and Tuberculin Desensitization.—The close relation existing between histamine and anaphylactic shock is well known and it suggests the rôle that histamine plays in allergic phenomena. Assuming the hypothesis that histamine is causative of the deleterious action on the tissue cells, it is only logical to try to counteract its action avoiding its liberation or neutralizing it (histaminase) or adopting the tissue (tachyphylaxis) so as not to show its action. This is what is called nonspecific desensitization or hyposensitization. Based on these facts, nonspecific histamine and specific tuberculin desensitization were practiced on a series of guinea pigs in order to compare the results and evaluate their action in the phenomena of the sensitization of the tuberculous inflammation. Sixty-six pigs were used for the experiment, divided into three series and were infected with 1.0 mg. of tubercle bacilli, subcutaneously in the first series, intratracheally in the second and intravenously in the third. Each series consisted of a control group, a second group treated with histamine and a third treated with tuberculin. In all the pigs the tuberculin sensitization was tested by the Mantoux technique. The chronologic evolution of the primary complex was analyzed in its two components, the primary focus and the regional lymphadenitis. In the series infected subcutaneously it was observed that in the groups desensitized with histamine and tuberculin there was evident retardation in the evolution of the nodule and ulceration of the lymph node involvement as compared with the control group. Observing the final development of the inoculation ulcer, it was noted that in those treated with tuberculin

the ulcer closed surrounding a caseous block; in those treated with histamine the ulcer healed with fibrosis, while in those of the control group the ulcer persisted until the death of the animal. The above characteristic also appeared in the general feature in the series infected intratracheally and intravenously, the lymphadenitis and caseation being smaller in the groups treated with histamine and tuberculin. The intravenous infection was characterized by a splenomegaly, which was smaller in the tuberculinized animals; the difference was noted principally in those treated with histamine, as compared with the control group. The study of the tuberculin sensitization curve showed the effect of tuberculin desensitization. The histamine treated animals remained sensitive to tuberculin but their reaction to the Mantoux test was stronger than in the controls. Tuberculin sensitization appeared soonest in the intratracheally infected group, later in the pigs cutaneously infected and latest in the intravenously infected pigs.—*Tuberculosis experimental y desensibilizacion con histamina y con tuberculina, Evolucion del complejo primario cutaneo y pulmonar, P. I. Elizalde, J. L. Monserrat & B. Anchezar, Rev. Asoc. méd. argent., March, 1944, 58: 125.*—(*J. Badell*)

Tuberculin Desensitization.—The authors studied the course of experimental tuberculosis in guinea pigs treated with crude tuberculin. Five groups of 5 animals weighing between 450 and 640 g. were used. Groups I and II received a sensitizing dose of 1 mg. of virulent tubercle bacilli in the groin. Four months later a second 1 mg. was injected. Group I was treated with tuberculin, group II was not. Groups III and IV served as controls for the first and second inoculations of tubercle bacilli. Group V was first treated with tuberculin and then infected. Daily doses of crude tuberculin were injected into the subcutaneous tissues of the abdomen. Starting with 1 mg. the dose was progressively increased to 2 g. by the third month. In group I treatments were begun twenty-eight days after the primary infection. In group V treatment started three months before infection and continued until two weeks after. Each animal received a total of 58.8 g. of tuberculin within a treatment period of 108 days. The most notable observation during the treatment of group I was the early scarring of the tuberculous ulceration at the site of the primary inoculation. Healing was noted by the ninth day when only 56 mg. of tuberculin had been given. On the forty-fifth day of treatment the intracutaneous reaction was negative to 8 mg. of tuberculin. The second inoculation of bacilli into group I resulted in an early, shortened, attenuated reaction with little scar formation. The experiment was allowed to run until the death of all animals except 2 which were sacrificed. The weight curves showed considerable variations but no constant response to infection or treatment. At autopsy the animals in group I had no gross visceral lesions. In the inguinal lymph nodes there were small caseous centres. Group II animals, in contrast, had extensive lesions in the lungs, liver, spleen, and lymph nodes. Groups III and IV showed similar but more caseous lesions. Group V animals, tuberculin treated for three months preceding infection and for two weeks thereafter, showed disseminated fibrous or productive visceral and lymphatic lesions. The authors do not feel that their findings quite demonstrate the persistence of immunity after desensitization. They conclude (*1*) that desensitization is a fact, (*2*) that the treated animals early show evidence of increased immunity or heightened resistance, and (*3*) that the scarcity of macroscopic visceral lesions in the treated animals is related to desensitization and not to a direct chemical action of the tuberculin used. In the discussion which follows A. E. Bianchi affirms that the experiment proves that the treated animals have lost their hypersensitivity to tuberculin but not their allergy. Their prompt, shortened, and attenuated reaction to a second inoculation of tubercle bacilli is proof of the presence of allergy, a phenomenon which is distinct from both hypersensitivity and immunity.—*Tuberculosis experimental y desensibilization tuberculinica, P.*

Elizalde, O. Otoiz & B. Anchzar, Rev. Asoc. méd. argent., April 15, 1944, 58: 165.—(R. Kegel)

Influence of Hormones on Tuberculin Reaction.—Hormones and tuberculin were injected at the same time into children with clinical and X-ray evidence of tuberculosis. Total extract of the thyroid and thyroxin enhanced, in the majority of cases, the skin reaction to tuberculin; extracts of the parathyroids and pituitrin usually caused a decrease in the intensity of the reaction. Adrenalin caused a slight decrease in about 50 per cent of the cases; hypophysin increased the reaction in some cases, whereas the thymus had no effect at all. An explanation of these phenomena is attempted: (*1*) these hormones act differently on the neurovegetative system and on the nerves which control the vessels; (*2*) in tuberculosis the vegetative system is altered in varying degrees.—*Azione degli ormoni sulla reazione alla tubercolina, B. Edilio, Ann. Ist. Maragliano, 1941, 11: 111.—(G. Simmons)*

Inhibition of Cathepsin by Tuberculin.—In view of experiments by Moen (showing that tissue cultures made from the spleens of animals infected with virulent tubercle bacilli were less active in their initial growth, when exposed to tuberculin, than were those taken from animals infected with an avirulent culture) and previous experiments by the authors (indicating a significant decrease in catheptic activity of the spleens of animals intravenously infected with tubercle bacilli—more so when virulent bovine than when bacilli of the R_1 strain were used) additional studies were undertaken in the hope of finding a catheptic inhibitor in tuberculin which might contribute to its cytotoxic action. PPD was used in the experiments. It was found that this substance produced a decrease of approximately 25 per cent in the activity of cathepsin II (an endocellular proteolytic enzyme presumably concerned in processes of cellular growth, repair and inflammation), and that this decrease was about the same whether the cathepsin was obtained from the spleens of normal animals or from those infected with virulent or avirulent tubercle bacilli. Varying the concentration of PPD from 1×10^{-1} to 1×10^{-7} had no effect. Enzyme solutions prepared from other organs such as liver and kidney were similarly affected. PPD apparently acts as a general cathepsin inhibitor. Since phosphatide fractions have a similar effect, it is possible that these may be the inhibitors preventing caseous tuberculous tissue from undergoing autolysis.—*Studies on Inflammation. VI. Inhibitory Action of Tuberculin on Cathepsin, C. Weiss & Nellie Halliday, Arch. Path., April, 1944, 37: 272.—(D. G. Freiman)*

Skin Reaction in Boeck's Sarcoid.—After the intracutaneous injection of a suspension of sarcoid tissue, obtained from a lymph node or a cutaneous nodule and prepared according to Frei's technique, the formation of a cutaneous nodule occurs at the site of the injection after one or several weeks, only in patients who have Boeck's sarcoid. This nodule persists for weeks or months and shows a structure identical with that of spontaneous sarcoid. Since the formation of such nodules could not be obtained with the same technique in normal individuals, it is considered a specific allergic skin reaction and the author is inclined to consider Boeck's sarcoid a separate disease entity.—*Eine neue spezifische Hautreaktion bei Boeckschem Sarkoid, A. Kveim, Nord. med., 1941, p. 169.—(G. Simmons)*

Tuberculous Infection of Mice.—Mice were infected by exposure to air-borne suspensions of *M. tuberculosis*, bovis, introduced into a closed system. The author reports that the relatively high resistance possessed by mice to subcutaneous inoculation does not hold with the respiratory tract, since he found that comparatively small numbers of bacilli were capable of setting up infection, although the disease produced was not necessarily progressive. The organisms localized in the interaveolar tissues and evoked a reaction which bore a strong resemblance to that produced

in mice when injected either subcutaneously or intracutaneously with large doses. Bacilli multiply exceedingly freely and may spread throughout the pulmonary system. The tissue reaction is, however, mainly proliferative with the appearance of numerous "foam" and mononuclear cells. Caseation and necrosis were not seen. The figures, reported by the author, suggest that this species is almost as susceptible as the rabbit to infection by the respiratory route.—*Infection of Mice with Mycobact. Tuberculosis (Bovis) by the Respiratory Route, R. E. Glover, Brit. J. Exper. Path., October, 1944, 25: 141.*—(*H. J. Henderson*)

Pulmonary and Extrapulmonary Tuberculosis.—At the conclusion of the period of generalization of tuberculosis, there is a humoral immunity which permits the development of tuberculosis only in isolated organs. In about one-fourth to one-third of the tuberculous patients no humoral immunity develops or it develops only slowly, so that for a long time metastatic spread remains possible and tuberculosis of multiple organs may result. Generally the single *poussées* of such a tuberculosis are benign, but due to the prolongation of the period of generalization the danger of a miliary tuberculosis or of a meningitis remains. The tendency to such forms of tuberculosis appears to be based on constitutional and hereditary properties. Since such patients appear to be sensitive toward superinfection, they should be separated from cases of open tuberculosis. Desensitization with tuberculin may decrease the allergic sensitivity and may shorten the period of generalization.—*Über die isolierte und multiple Organtuberkulose und über das Verhältnis der pulmonalen zur extrapulmonalen Tuberkulose, F. Ickert, Klin. Wchnschr., 1942, 1: 513.*—(*G. Simmons*)

Extrapulmonary Tuberculosis.—Three cases of extrapulmonary tuberculosis without manifest pulmonary lesions are presented. Two of the cases present acute symptoms of rheumatism with formation of abscesses which were opened and developed tuberculous sinuses; one of the 5 cases had also Pott's disease. The third case had painful enlargement of the lymph nodes of the right side of the neck, supraclavicular area and of the right axilla. None of the cases presented any symptoms of pulmonary tuberculosis on auscultation. The Mantoux test was positive in all 3 cases. The sputa were negative for tubercle bacilli; the serological tests were negative; fluoroscopic examinations and X-ray films of the chest failed to reveal any parenchymatous lesion, except slight enlargement of both hila and blood vessel markings in one case. Hemograms were within normal limits in 2 cases, but biopsies were performed and the ulcerative processes were tuberculous in all 3 cases. The cases were three of the most varied forms of extrathoracic localization in the bone, skin and lymph nodes. The author states that extrapulmonary tuberculous lesions are more frequent than it is generally believed. These tuberculous or pseudotuberculous extrapulmonary lesions are often not recognized.—*Algunos casos interestantes de tuberculosis extrapulmonares, sin lesiones pulmonares evidentes o evolutivas, T. Garcia Pérez, Rev. de tuberc. d. Cuba, October–December, 1943, 7: 510.*—(*J. Badell*)

Treatment of Tuberculous Bronchitis.—In pulmonary tuberculosis the prognosis is considerably worse if it is associated with tuberculosis of the bronchi. The effectiveness of collapse therapy depends largely on this complication. The obstruction of a bronchus can occasionally have a favorable effect on tuberculosis of the pulmonary parenchyma. The resulting atelectasis may cause closure of a cavity and lead to sclerosis of the lesions. The development of bacilli is impeded by the lack of air. On the other hand, an unfavorable effect is produced if the bronchitis is of the progressive type. The apneumatosis causes progression of the pulmonary lesions, secondary infection, empyema and even bronchopleural fistula. There is still much difference of opinion as to the efficiency of collapse therapy in these cases. Some believe that pneumothorax has a favorable effect even on tuberculous lesions of the trachea and the

large bronchi. Others believe that a pneumothorax will aggravate the condition. Alexander is of the opinion that collapse therapy, especially thoracoplasty, has no influence whatever on tuberculous ulcerations of the trachea and the bronchi. The authors believe that pneumothorax has a decidedly beneficial effect on the pulmonary lesions even if they are complicated by bronchial ulcerations. They base their opinion on the fact that they had a large number of good results in cavernous types of tuberculosis with ulcerations, endobronchitis, or even ulcerative stenosis of the bronchi, and that the discontinuation of pneumothorax has always been followed by a disastrous result. But the results are always much inferior to cases not complicated by bronchial ulcerations. Ornstein and Epstein use pneumothorax even in all cases of tuberculous bronchitis without involvement of the parenchyma to prevent pulmonary spread. On the other hand, a pneumothorax may transform a partial obstruction into a complete occlusion. Phrenemphraxis is more dangerous than pneumothorax. Thoracoplasty is considered the method of choice. Each case must be considered individually after bronchoscopy and after a pneumothorax has been tried. If the endobronchitis is of congestive or edematous nature, the treatment will be established as if no complications existed. In all other cases, the bronchial lesion must be treated locally by application of silver nitrate, before the commercement of collapse therapy. In their own clinic the authors treated cases having minimal bronchial lesions with pneumothorax. The more advanced cases were treated with thoracoplasty and also, if possible, those with stenosis of a bronchus. When this is not feasible and the lesions are localized in the middle or inferior lobe, lobectomy is done, provided the bronchus is not affected orad to its surgical division. Phrenicotomy is considered contraindicated in all cases. Bilateral bronchial ulcerations are generally past any surgical intervention. If a lobular atelectasis exists in a patient previously treated with pneumothorax, a thoracoplasty is done, but the collapse of the lung by air is maintained during and after the operation to avoid reëxpansion of the unaerated lobe with its often disastrous results.—*El tratamiento de la tuberculosis pulmonar con bronquitis tuberculosa asociada, R. F. Vaccarezza & A. E. Bence, Prensa méd. argent., October 4, 1944, 31: 1971.*—*(W. Swienty)*

Tuberculosis of Trachea and Bronchi.—The author reports his autopsy observations on 100 patients dying of pulmonary tuberculosis (age and sex not stated). On gross examination ulcerative lesions of the trachea were found in 20 patients. Lesions of some segment of the primary or lobular bronchi were found in 25 patients. Counting both tracheal and bronchial lesions a total of 32 patients was affected. One patient showed an almost complete stenosis of the bronchus to the right upper lobe. In another patient a caseous lymph node had perforated the wall of the right upper lobe bronchus. Histological studies showed tuberculous lesions of the trachea in 28 and of the bronchi in 70 patients. Macroscopic tuberculous laryngeal lesions were found in 54 of 99 postmortem examinations. Of the 54 patients with laryngeal tuberculosis, 30 per cent showed macroscopic tracheal lesions and 39 per cent bronchial lesions while of the 45 patients with normal larynges only 9 per cent had tracheal lesions and 9 per cent bronchial lesions. The author notes the frequency of extensive caseation of the peribronchial lymph nodes and of fresh tuberculous caseous bronchitis.—*Lesiones tuberculosas de la traquea y de los bronquios encontradas en cien autopsias de tuberculosos, J. A. Perez, Rev. de tuberc. d. Uruguay, No. 1, 1944, 12: 1.*—*(R. Kegel)*

Patent Bronchi.—The use of methylene blue instead of lipiodol for the determination of the patency of a bronchus leading into a cavity is advocated. From an analysis of the period of time it took the patient to bring the dye up in the sputum and of the position of the patient an idea of the patency and the position of the draining bronchus can be obtained.—*Beitrag zur Darstellung des ableitenden Bronchus der*

tuberkulosen Kaverne, J. Obstmayer, Beitr. z. Klin. d. Tuberk., 1942, 97: 684.—(G. Simmons)

Tuberculous Tracheobronchitis.—Bronchoscopy was performed in all cases of pulmonary tuberculosis as a routine examination, except when definitely contraindicated. In 1,200 cases no serious complications were observed. Congestion and edema of the bronchial mucosa were common findings; their interpretation, however, is difficult, unless they are associated with definite tuberculous lesions, or their evolution on successive observation proves to be toward typical submucous infiltration or ulcerogranulomatous lesions. Bronchial stenosis in pulmonary tuberculosis can be caused by endobronchial changes (congestion, edema, ulcero-granulomatous or fibrostenotic lesions), or by tracheobronchial or hilar adenopathy. While the first type of bronchostenosis occurs more often in adults, the latter is more frequent in children. The bronchoscopic examination discloses certain data concerning the flaccidity or the rigidity of the bronchial wall, and also certain kinetic changes of the bronchial tree in relation to the status of the other components of the respiratory tract. The following bronchoscopic findings were recorded in the presence of therapeutic pneumothorax: the normal upwards and downwards dislocation of the carina, produced by the act of respiration, shows a deviation toward the collapsed side during the downward movement; the greater bronchi appear shortened, but not collapsed, and follow the respiratory movements; the lobar bronchi are dislocated and their respiratory excursion is reduced; the intralobar branches may remain normal in the healthy lobuli, while they appear condensed in the collapsed lobuli. The diagnosis of tuberculous tracheobronchitis is based on the clinical syndrome and on the bronchoscopic findings, confirmed by the presence of tubercle bacilli in the sputum. Biopsy is mostly contraindicated, particularly in nonulcerative lesions. The treatment of endobronchial tuberculosis, in absence of clinically evident parenchymatous involvement, is directed to calm the symptoms, to cure the lesions and to prevent stenosis. Gold therapy and vitamin C can be given, besides general measures and symptomatic medication. Silver nitrate in 20 per cent solution, used every fifteen days, appears to be the most rational local therapy. Bronchoscopic dilatation, followed by aspiration of the secretions, can be attempted in localized annular stenosis after the disappearance of all symptoms of activity. This method is, however, risky and the results are uncertain. The suppurative complications beyond the blocked bronchus are treated by endoscopic dilation and aspiration of the pus and by local sulfanilamide therapy. The treatment of endobronchial tuberculosis associated with active and extensive primary or postprimary lesions has to be more conservative than that of the apparently primary endobronchial disease. The presence of endobronchial disease impairs the prognosis of pulmonary tuberculosis and complicates also the various collapse-therapeutic measures. The available statistical data are still contradictory in this respect. When the involvement is limited to the bronchus of the diseased lobe, pneumothorax is still possible, especially if complemented by rational bronchoscopic treatment. In the presence of more extensive bronchial tuberculosis, surgical treatment can only be considered after the bronchial lesions have become at least quiescent. Thoracoplasty sometimes followed by pneumonectomy, or lobectomy or pneumonectomy not preceded by thorocoplasty, can be performed successfully in a certain number of cases. The revision of a series of ineffective pneumothoraces has shown that bronchial lesions are a frequent cause of the failure of the collapse therapy. The bronchial tree has shown little changes in those cases where a pachipleuritis was the cause of the failure of the lung to reëxpand. There were more important bronchoscopic findings in lungs showing an extensive fibrosis. It appears evident that a bronchoscopic examination must precede every collapse-therapeutic procedure.—*Traqueobronchitis tuberculosa, R. A. Piaggio Blanco & J. C. Dighiero, Rev. de tuberc. d. Uruguay, No. 5, 1943,* ***11:*** *313.—(L. Molnar)*

Closure of Bronchocutaneous Fistula with Muscle Flap.—A bronchocutaneous fistula will often not close after drainage has been discontinued, whereupon it is necessary to close it by surgery. For this purpose Aguilar uses a muscle flap in cases where drainage of a pulmonary abscess has resulted in a bronchial fistula of moderate size. It should be made certain that the local inflammation has subsided, that there is no bronchiectasis of considerable size and no residual empyema cavity. The coexistence of tuberculosis does not change the operative outlook, but should be known in advance. The technique consists of a combination of resection of the fistula tract and the filling-in of the resulting cavity with a pediculated muscular flap. This flap should be sufficiently large to close not only the tract but also all possibly existing intrapulmonary residual cavities. The muscle must be cut in the direction of the fibres and as much fat as possible should be adherent to it, as this contributes to better nourishment of the flap. Under local anesthesia the fistula is removed by circular incision. A muscle flap is mobilized after careful hemostasis. This flap is introduced and after it has been made certain that all of the scar tissue has been removed and the healthy lung tissue laid free, the flap is introduced into the resulting funnel and secured there with separate stitches. A rubber drain is inserted and local compression maintained for five to seven days.—*Cirugia toracica, Fistulas bronchocutaneas, cierre con colgajo muscular, D. Aguilar, Prensa méd. argent., August 9, 1944, 31: 1469.*—(*W. Swienty*)

Diagnosis of Hilar Adenopathy.—The increasing frequency of primary tuberculosis in the adult has made the radiological diagnosis of the tracheobronchial adenopathy a matter of current importance. As a matter of fact, when no reference is had to tuberculin conversion, the presence of mediastinal lymph node enlargement indicates, with few exceptions, a diagnosis of primary tuberculosis. The radiological diagnosis of this hilar adenopathy is nevertheless difficult. Many abnormal hilar shadows are diagnosed as lymph node enlargement. Lateral radiography and tomography are thus of great value in those cases, as they permit the elements of the radiological hilum to be distinguished from each other. Thus the pulmonary processes located on the borders of the lung and particularly on the apex of the inferior lobe can be diagnosed. Very often the enlarged hilar image corresponds to an abnormality of the pulmonary artery. It is emphasized that sometimes the pulmonary artery in the left hilum is not mostly covered by the edge of the pericardium, the result of which is an enlarged radiological image, which commonly is interpreted as hilar adenopathy. With these restrictions the diagnosis of a tracheobronchial tuberculous adenopathy has been made only twice in 1,389 cases, one of which was confirmed at autopsy. The study of the lateral radiogram, where the lymph node enlargement is projected behind and under the tracheal bifurcation, or before and/or behind the trachea, is emphasized. The pulmonary artery is projected in front of the tracheal bifurcation.—*Algunas consideraciones sobre el diagnostico radiologico de adenopatia traqueobronquica tuberculosa en el adulto, B. Juricic, G. Gonzalez & H. Duran, Ap. respir. y tuberc. (Chile), April-June, 1944, 9: 103.*—(*H. Behm*)

Bilateral Pleurisy and Phlebitis.—Within a period of four months a 28 year old male whose father had pulmonary tuberculosis with cavitation developed successively a parotitis, a unilateral orchitis, a serofibrinous effusion in the left pleural cavity, a pleuritis on the right side (both processes initiated by a paralytic ileus) and finally a phlebitis of both legs. The pleural fluid was not examined but the author believes the pleurisy due to tuberculosis. He feels that tuberculosis is the probable cause of the phlebitis also. No direct evidence is adduced.—*Pleuresia sero-fibrinosa, cortico-pleuritis, y flebitis sobre su etiogenia, H. E. Osacar, Rev. méd .d. Hosp. Ital. d. La Plata, June, 1944, 1: 127.*—(*R. Kegel*)

Tuberculous Pleurisy.—Serofibrinous pleural effusion occurred in 50 cases of the post-primary stage of childhood tuberculosis between the ages from 7 to 12 years. The complication developed more frequently in spring than in any other season and involved both the homolateral and contralateral hemithorax. Fifty-two per cent occurred during the period of sanatorium treatment. Rest, therefore, seems to be of little preventive importance. Pleural effusion like other toxemic manifestations is probably inevitable and depends on constitutional and immunobiological factors. In 9 cases the course was afebrile, in 35 cases fever lasted from 7 to 20 days, in 4 from 20 days to 2 months and in 2 from 7 months and over. The immediate prognosis depends much on the course during the first month, on fever, sedimentation rate and radiological signs. Ninety-eight per cent of the cases of so-called allergic serofibrinous pleurisy healed. In cases of an established pleural tuberculosis the prognosis is grave: 2 of 5 children with this complication died.—*Consideraciones sobre pleuresia serofibrinosa tuberculosa y su pronostico, R. Matte & E. Saldias, Rev. chilena de pediat., August, 1944, 15: 638.*—(*F. G. Kautz*)

Therapeutic Cutaneous Emphysema.—A cutaneous emphysema was artificially produced in order to obtain a nonspecific stimulus over a diseased organ. One hundred to 400 cc. of air were thus introduced subcutaneously. Four cases are reported. This kind of treatment was used in cases of pleurisy with and without effusion. In the majority of cases the results were "surprising." Improvement was obtained in several cases of persistent disease of the colon. No objective results were obtained in peptic ulcers. In 3 cases of chronic arthritis the results were "satisfactory." Bronchial asthma was not benefited.—*Das artifizielle Hautemphysem zur Reiztherapie, R. Boller, Klin. Wchnschr., 1942, 1: 587.*—(*G. Simmons*)

Primary Tuberculosis of Palate.—The authors present a case of tuberculous ulceration of the gums which is considered to be a primary complex. Biopsy revealed giant cells of the Langhans type and epithelioid cells. Aspiration of the submaxillary lymph node revealed caseation and numerous tubercle bacilli. This condition is very rare. This was a primary infection in a 24 year old patient. She had been treated previously for infection of the gum and syphilis without success. The Mantoux test, applied late in the disease, was strongly positive. Following the test the patient had a general reaction with fever and a local increase of the ulcer. The cervical lymph nodes broke down. Subsequently, she was treated for her tuberculosis. The lesions of the gum and the node disappeared, leaving only slight scars. There was no evidence of any tuberculosis of the lungs.—*Tuberculosis primitiva del paladar, V. J. Bertola & A. Ferraris, Prensa méd. argent., November 1, 1944, 31: 2219.*—(*W. Swienty*)

Tuberculosis of Stomach.—Ulcerative tuberculosis of the stomach is infrequent; the number of cases hitherto reported approximates 200, though Chaffin (1937), eliminating doubtful cases out of 211 published, only considered 51. Eustermann and Balfour (1938) recorded only 58 cases. Sometimes the ulcer is a fortuitous autopsy finding and in some other instances its presence is manifested by hematemesis or gastric perforation. Both hematemesis and perforation occurred in the present case, a 22 year old soldier who had pulmonary and pleuroperitoneal tuberculosis with a positive sputum and a negative Mantoux test. The main findings at the post-mortem examination were two esophageal ulcers, one of them perforated, opening into a fistulous tract from a softened caseous peri-esophageal lymph node. In the stomach there was a great amount of liquid and clotted, undigested blood; a perforated ulcer in the neighborhood of the cardia, several other gastric ulcers were scattered throughout the mucosa. There was a generalized intestinal tuberculosis. Nodular lesions, predominantly exudative, were found in all the layers of the stomach. Blood vessels participated in the

process, presenting lesions of stenotic endoarteritis, some of them with parietal or occlusive thrombi. The lymphatic vessels contained caseous thrombi and stenotic productive lymphangitis. Two fundamental mechanisms have been invoked in the production of ulcerative tuberculosis of the stomach: hematogenous dissemination (Pripier, Arloing) and lymphatic spread (Chiari, Rosset, Grossmann). Attention is called to the fact that there was a predominance of lesions due to the hematogenous spread in this case.—*Ulceras tuberculosas multiples del estomago, una de ellas perforada, D. Fernandez Luna & R. I. Latienda, Rev. Assoc. méd. argent., January–February, 1944, 58: 30.—(J. Badell)*

Tuberculosis of Stomach.—Gastric tuberculosis is rare—0.11 per cent of all tuberculosis cases. Only 25 cases were published so far in the Japanese literature. In the majority of cases gastric tuberculosis is a secondary infection caused by swallowing of infected sputum. Thirteen of the cases reported were considered cases of primary gastric tuberculosis. Gastric tuberculosis may assume one of three forms: (*1*) ulcerative, (*2*) hypertrophic, (*3*) atrophic. The case reported, diagnosed clinically as a benign pyloric stricture and operated on, showed multiple ulcers in the pyloric region with an extensive gastritis. The perigastric lymph nodes were tuberculous. In this case the gastric tuberculosis was obviously secondary to pulmonary tuberculosis, since the patient had bilateral apical disease and had been under treatment before for his pulmonary condition as well as for a tuberculous lymphadenitis of the neck.—*Über einen operierten Fall von Magentuberkulose, Y. Kabuki, Deutsche Ztschr. f. Chir., 1942, 355: 309.—(G. Simmons)*

Tuberculosis of Stomach and Cancer.—A case of gastric tuberculosis with secondary carcinomatous degeneration is reported. Clinically the diagnosis of carcinoma was made and the patient was operated on (Billroth-1-Kocher). The operation was successful. The final diagnosis was made microscopically. Only 24 cases of gastric tuberculosis and carcinoma have been reported in the literature so far.—*Ein Fall von Magentuberkulose mit sekundärer krebsiger Wucherung, F. Adamesik & J. Erdély, Chirurg., 1942, 14: 304.—(G. Simmons)*

Duodenal Tuberculous Ulcer.—In 600 autopsies of cases of tuberculosis, a total of 21 intestinal ulcers (3.5 per cent) were found; among them 4 were peptic ulcers, one case of hemorrhagic erosions, 13 lenticular ulcerations and 3 nummular caseous ulcers. Of these 3 cases the last one was a 30 year old male, with advanced pulmonary and intestinal tuberculosis. There was a periduodenitis; no ulcer was seen. The patient died a year later and at autopsy the main features were: generalized mesenteric caseous adenopathy; near Vater's ampulla was a crater-like ulceration and tubercles in the duodenal wall, corresponding to lymph nodes, and engorged lymph vessels emptying in the anterior duodenopancreatic lymph nodes. There were scattered ulcers in different parts of the intestinal tract and at the splenic flexure a small one was perforated. Histological sections of the ulcer revealed tuberculous lymphangitis and softened caseous tubercles teeming with tubercle bacilli. In reviewing the pathogenesis of the ulcer, the retrograde lymphatic way is the most acceptable way to explain it, considering the existence of a caseous tuberculous adenopathy of the superior mesenteric lymph nodes, and the fact that the pancreaticoduodenal lymph nodes are tributory of the mesenteric nodes. There was probably a stasis in the lymph channels of the second and third portions of the duodenum and the infection of their contents caused the tuberculous lymphangitis and the ascending infection of all the parietal portion of the duodenum.—*Ulcera tuberculosa caseosa de la segunda porcion del duodeno, D. Fernandez Luna & F. Cruz Arnedo, Rev. Asoc. méd. argent., January-February, 1944, 58: 17.—(J. Badell)*

Enterogenous Tuberculosis.—X-ray films of the chest, the abdomen and the neck were

made in 155 children with a positive skin reaction. In 70 cases (45 per cent) X-ray evidence of tuberculosis was found. And, surprisingly, in 31 cases there was evidence of healed tuberculosis in the abdominal lymph nodes. Clinically the diagnosis of tuberculosis of the abdominal lymph nodes is extremely difficult and a diagnosis can only be made after the nodes have become calcified. In one-fourth of the cases with tuberculosis of the lymph nodes there were signs suggestive of intestinal tuberculosis. This condition is particularly frequent among children of the age group 1 to 3. Not infrequently a fatal meningitis originates from an enterogenous primary complex (10 per cent). The author considers, therefore, enterogenous tuberculosis infection in children a great danger.—*Die Bedeutung der enterogenen Tuberkuloseinfektion im Kindesalter, O. Cammann, Med. Klin., 1942, 11: 673.*—(*G. Simmons*)

Tuberculous Peritonitis.—Of 21 cases of tuberculous peritonitis observed within a period of 6 years, 17 occurred among ward patients and 4 among the private patients of a General Hospital. The majority of the patients was between the ages from 19 to 30 years; one child of 12 years, one woman of 43 years and one woman of over 80 fell outside of this age group. The race distribution was 3 whites, 3 Indians and 15 Mestizoes. The lesion was diagnosed in 8 cases as ascites and in 13 cases as a fibroplastic peritonitis. During the hospital stay no other active tuberculous focus could be discovered. The symptomatology of tuberculous peritonitis is protean and often simulates appendicitis, salpingitis, cholecystitis and abdominal tumors. The preoperative diagnosis in these cases was correct in 70 per cent, definitely established in 45 per cent and strongly suggestive in 25 per cent. Treatment consisted in laparotomy. The author feels that tuberculous peritonitis should be kept in mind whenever one of the common abdominal lesions presents a bizarre course. The clinical diagnosis can often be made with accuracy. A diffuse median contraction of the abdominal wall without any further definite point tenderness and without abdominal distention proved to be a persistent and reliable diagnostic sign.—*Peritonitis tuberculosa, E. St. Loup, Gaz. Med. Quirurg. de Bolivia, May, 1943, 1: 9.*—(*F. G. Kautz*)

Pyelogram in Renal Tuberculosis.—In early tuberculosis of the kidney the three main diagnostic findings, namely, tubercle bacilli in the urine, pyuria and renal dysfunction, may be absent. Even the presence of tubercle bacilli in the urine is not of absolute diagnostic value, because the problem as to whether bacilluria cannot be present despite a perfectly healthy kidney is not yet solved. The author is of the opinion that the pyelogram is an important aid in the diagnosis of early kidney tuberculosis, and he distinguishes three early stages: (*1*) small, marginal foci of destruction in the kidney parenchyma adjacent to the pelvis; (*2*) small caseous foci or cavities in the medulla, communicating with the pelvis; (*3*) caseous foci or cavities not communicating with the pelvis. In the first and in the last case the findings are of no additional diagnostic value, because similar changes may occur in nonspecific conditions of the kidney. In the second case, however, the findings are said to be so typical, that they alone are sufficient for a diagnosis.—*Die Früherkennung der Nierentuberkulose im Pyelogramm, C. H. Schroeder, Ztschr. f. urol. Chir. u. Gynäk., 1942, 46: 274.*—(*G. Simmons*)

Tuberculosis and Hydatid Cyst of Kidney.—One instance of this rare combination is reported. The patient was a 38 year old mother of six healthy children. The present illness began with an acute attack of renal colic three years previously. The patient was well until six months before admission when right-sided pleuritic pain followed by a dry cough, dyspnea on exertion, anorexia, asthenia and night sweats appeared. She lost 44 pounds. The physical examination revealed signs of a pleural effusion. In the right upper abdominal quadrant there was an orange-sized, painful mass apparent on deep palpation. A

thoracocentesis yielded 800 cc. of yellowish green purulent fluid. A guinea pig inoculated with the fluid died of intercurrent infection. Six weeks later profuse pyuria occurred and the abdominal tumor disappeared. Retrograde pyelography outlined a cyst in the superior pole of the right kidney. Casoni's reaction was strongly positive. An operation was attempted, during which the patient died. Autopsy revealed a tuberculous pleuritis and a fibrotic tuberculosis of the right lung. In the upper pole of the right kidney there was a 12 x 5 x 3 cm. cyst with calcified walls. The cyst was firmly adherent to the diaphragm but no communication between pleura and cyst was found. Microscopic examination showed an exudative tuberculosis of the kidney.—*Tuberculosis y quiste hidatico asociados en riñon derecho, A. Cisneros, J. Parisi & G. Cahn, Rev. Asoc. méd. argent., July 30, 1944, 58: 584.—(R. Kegel)*

Tuberculous Aneurysm.—A 72 year old white woman was admitted to the hospital with complaints of abdominal pain, fever, chills and weight loss. On physical examination there was a large, moderately tender, firm, slightly movable mass in the right lateral portion of the abdomen. Death occurred under the signs of blood loss. At autopsy a large perirenal hematoma was found in the right paravertebral gutter. Attached to the mediocephalad vertebral surface of the hematoma was a firm brownish purple dumb-bell-shaped mass, measuring 8 by 6 cm., which encircled the anterior margin of the abdominal aorta between the diaphragm and the celiac axis. In the right ventral aspect of the aorta there was an oblong rent, 1 cm. in diameter. The peritoneal portion of the dumb-bell-shaped sac consisted of periaortic connective tissue. There was a laceration from this sac into the perirenal space. On microscopic examination there was necrosis of the media at the mouth of the aneurysm. The adventitia was thickened and showed Langhans cells, lymphocytes and plasma cells. Acid-fast bacilli were found between the elastic tissue fibres of the aorta. There was tuberculosis of lungs, liver, spleen, kidneys, adrenals. It is believed that acid-fast bacilli were disseminated from a right hilar lymph node through the blood stream to the media of the aorta.—*Tuberculous Aneurysm of the Abdominal Aorta, J. N. Owens, Jr. & A. D. Bass, Arch. Int. Med., December, 1944, 74: 413.—(G. C. Leiner)*

Pericardium in Tuberculous Patients.—In 22 per cent of 45 patients who died of pulmonary tuberculosis microscopic examination of the parietal pleura revealed the presence of tuberculous changes. In almost all cases specific cellular reactions were found in addition.—*Ricerche istologiche sulla membrana pericardica parietale di soggetti deceduti per tubercolosi polmonare, I. Rocchio, Ann. Ist. Carlo Forlanini, 1943, 7: 73.—(G. Simmons)*

Meningitis and Tuberculosis of Uterus.—The present report deals with a 25 year old female who was admitted to the hospital in a state of stupor, delirium and mental hallucinations. A diagnosis of tuberculous meningitis was established; the patient died eleven days after her admission. The main features revealed by the postmortem examination were caseous tuberculosis of the uterus, fallopian tubes and ovaries, left tuberculous pleuritis, miliary lesions in the right upper lobe, tuberculous perihepatitis and tuberculous meningitis. The extensive and far-advanced salpingo-uterine lesions prove that they preceded the meningeal lesions; the other seedings in pleura, lung and liver reveal successive localizations. It is very infrequent to see primary or secondary tuberculosis of the uterus ending in tuberculous meningitis.—*Tuberculosis caseosa del utero: Meningitis terminal tuberculosa, I. R. Steinber & C. A. Crivellari, Rev. Asoc. méd. argent., January–February, 1944, 58: 25.—(J. Badell)*

Tuberculosis of Eye.—In honor of Robert Koch the authors celebrate his one hundredth birthday anniversary with a review of his discoveries and their influence on ophthalmology. In his famous experiments he succeeded

in causing pulmonary and generalized tuberculosis by inoculation of tubercle bacilli into the anterior chamber of the eyes of rabbits. After inoculation in the conjunctiva, changes occur in the preauricular lymph node which are easy to observe. Twenty cases of primary tuberculous conjunctivitis without lymph node changes have been observed, the last by MacKenzie. The prognosis of primary infection of the conjunctiva is always guarded. The authors saw one case in which the lungs were infected. Tuberculous infection of the cornea has to be considered as reinfection. It has not been possible to cause tuberculous lesions in the deep structures of the eye by direct spread. In 74.1 per cent of a series (70 cases) of phlyctenular conjunctivitis published by Ruzo and others in 1942, tubercle bacilli were found in the gastric contents and 58.8 per cent had pulmonary lesions. All cases but one had a positive patch test. As phlyctenulae can be produced by all types of allergic substances, it can be said that the phlyctenula is a nonspecific reaction. In warm countries it is known to be a complication of catarrhal conjunctivitis. Intraocular tuberculosis has to be considered as a localization by hematogenous spread. Primary tuberculosis in the eye is very rare. In the uvea it is due to suprainfection after allergization. The experiments of LaGrange and Stock (injection of bacilli into the carotid artery and auricular vein of the rabbit) are recalled. The relative rareness of tuberculosis of the eye in the far advanced stage of pulmonary tuberculosis has been explained by Ranke who found that there is little tendency to hematogenous spread in these cases. The most frequent forms of tuberculosis of the eye are iritis and iridocyclitis. These are allergic reactions but not always of specific etiology. Two forms of iritis may be distinguished, the exudative and the proliferative. The former is due to allergic reaction of the tissues and the latter due to the presence of the bacillus itself. It seems proved that local infection of the eye may persist without skin allergy. Phlyctenular conjunctivitis gives the highest percentage of positive skin tests. At the Santa Lucia Hospital the authors observed that intraocular tuberculous lesions are at least as frequent as phlyctenular conjunctivitis. In miliary tuberculosis of the eye, anergy is frequent. It is difficult to decide whether keratitis and scleritis are allergic reactions or not.—*Tuberculosis Ocular, E. Adrogue & B. G. Tiscornia, Rev. Asoc. méd. argent., December 15, 1943, 523: 1053.*—(*W. Swienty*)

Tuberculosis of Eye.—A brief historical sketch of general tuberculosis and of tuberculosis of the eye is presented. The first who called attention to ocular tuberculosis was Antoine Maître-Jan (born 1650). The invention of the ophthalmoscope by Helmhotz is discussed and a short biography of Robert Koch is given. From a review of the literature the author draws the following conclusions: The relation of ocular tuberculosis to tuberculosis of other organs, particularly the pulmonary form, has not been definitely established. A positive tuberculin reaction and a favorable response to tuberculin injections are no proof of the diagnosis. The eye appears to possess an immunity in active pulmonary tuberculosis. Phlyctenular keratoconjunctivitis is not usually of tuberculous origin. Tuberculous lesions of the eye are not nearly as common as they are generally supposed. Uveal tuberculosis is not necessarily secondary to tuberculosis elsewhere in the body. The nature of an infection in the anterior segment of the eye should always be determined in the laboratory.—*Ocular Tuberculosis: Its Relation to General Tuberculosis, B. L. Gordon, Arch. Ophth., June, 1944, 31: 541.*—(*G. C. Leiner*)

Arthrodesis in Tuberculosis of Hip.—In 45 cases of tuberculosis of the hip, 57 arthrodeses were done, 10 as secondary and 2 as tertiary procedures. In 60 per cent of the cases the diagnosis was proved by bacteriological and histological examination. An extraärticular arthrodesis without removal of the cartilage was performed in 53 cases and a combined extra- and intraärticular method only in 3 cases. Preoperative conservative care con-

sisting of bed-rest, high caloric diet, light exposure and orthopedic measures to the affected hip, at least in children, was usually followed by improvement of the general condition and by subsidence of local symptoms. The operation seems to be contraindicated in patients of less than 6 years of age since no patient operated on obtained a bony fusion. The operation is relatively contraindicated in children between 6 and 9 years of age because of an apparent slow healing of the bones and the soft tissues. The operation is contraindicated in the presence of a known abscess formation at the hip because of poor results as to the incidence of fusion and to the appearance and persistence of postoperative sinuses. Following the closure of the sinuses the prognosis of the operation is definitely better. The likelihood of fusion with complete operative program is good and fusion was obtained in 84 per cent of the adequately followed patients.—*Results following Arthrodesing Operations for Tuberculosis of the Hip, F. B. Roth, Bull. Hosp. Joint Dis., October, 1942, 3: 153.*—(*F. G. Kautz*)

Koch's Discoveries and Dermatology.—The great discoveries in bacteriology came at a time when dermatology was in its cytopathological phase after having passed through the purely morphological phase. Under the impact of bacteriology the etiologic concepts now are a synthesis of the former two phases. After a review of the forerunners of Koch and Pasteur, the author describes the immense achievements of Robert Koch and the benefit which dermatology drew from them. He deplores the indiscriminate employment of the word "allergy," the meaning of which is obscured. It is only the expression of a reactive and inflammatory effect and not the cause of a disease. The knowledge of tuberculosis etiology made it possible to establish clear clinical entities in dermatology. The reaction of the body to tuberculin is discussed. Nicolle believes that a lysine is present in the blood of the tuberculous patient which acts on the injected tuberculin and produces a toxic product which gives rise to local and general reactions. The intracutaneous reaction to tuberculin was the starting point for similar tests in other diseases. Vitón believes that a benign bacteremia explains many symptoms of low grade reactions, especially in acne. Bacterial toxins are liable to disturb the functions of the vessels and the parenchyma and may even modify their anatomical structures. It has been almost forgotten that medicine owes to Robert Koch the first application of atoxyl in trypanosomiasis which was a forerunner of arsphenamine. Ehrlich himself acknowledged that the study of atoxyl opened the way for the discovery of arsphenamine.—*Influencia de los descubrimientos de Koch en dermatologia, N. V. Greco, Rev. Asoc. méd. argent., December 15, 1943, 523: 1058.*—(*W. Swienty*)

Tubercle Bacillus and Endocrine Diseases.—An analogy is drawn between bacteriology and endocrinology. After the discoveries of Koch and Pasteur opened a new field of science, bacteriology, we see to-day a rapid succession of new discoveries in endocrinology. The results are often surprising. The pathology of the suprarenal glands is linked to the lesions produced by the tubercle bacillus. Of the first 11 cases published by Addison in his famous monograph, 5 had bilateral and one had one-sided tuberculosis of the adrenals. Tuberculosis of the adrenals causes a clinically well defined syndrome. Also of importance in endocrinology is tuberculosis of the ovaries and the adnexa. Tuberculous lesions in other endocrine glands play a rôle only in individual cases.—*El bacilo de Koch en las endocrinopatias, E. B. del Castillo, Rev. Asoc. méd. argent. December 15, 1943, 523: 1069.*—(*W. Swienty*)

Anatomy of Pleura and Endothoracic Fascia.—Microscopically there is a difference between the costal and the apical pleura. The pleura consists of (*1*) epithelial cells, (*2*) a thin underlying connective layer which has no vessels, (*3*) a thin superficial fibro-elastic layer, (*4*) a layer of connective tissue, containing few elastic fibres but rich in capillaries and arterioles.

This layer is about 0.25 mm. thick and contains sometimes numerous fat islands. This layer is often thickened and edematous and is followed by another thick structure, about 0.25 mm., which is firm and composed of fibro-elastic tissue: the endothoracic fascia. From the endothoracic fascia elastic fibres go to the aponeurosis of the intercostal muscles. Between the endothoracic fascia and the inner surface of the ribs there is a layer of extrafascial connective tissue, which is rich in fat and gradually loses itself into the intracostal structures. From the point of view of the microscopical structure, a separation can be obtained surgically within the fascia, in the subpleural connective layer and, extrafascially, in the extrafascial connective tissue. In the presence of inflammatory changes, however, all these layers disappear and are replaced by scar tissue. Above the first rib there is no endothoracic fascia. The latter loses itself gradually and the remains merge with the periosteum of the first rib. Here the thoraco-cervical diaphragm may be found, which consists of firm collagenous connective fibres and is almost entirely free of elastic fibres. Its insertion is at the upper border of the first rib. A separation of the lung in this region can be obtained only under the diaphragm. In conclusion, therfore, a separation of the pleura from the ribs can be best obtained below the first rib in the layer of the extrafascial connective tissue and above the rib under the thoraco-cervical diaphragm.—*Étude histologique sur les plèures costale et apicale et sur le fascia endothoracique, A. Policard & P. Galy, Acta med.-chir. appar. respirat., 1942, 15: 1.*—(*G. Simmons*)

Electrobiogenesis.—Blood is an electric complex in which energy originating in the outside world is accumulated and transformed. In the healthy individual the blood has a negative charge. In the sick organism the difference between the electric charge of the blood and that of the tissues is smaller than in the healthy individual. Health and disease are expressions of this changing dielectric state of the blood constituents. The basic principle in all diseases is the difference in the electric potential and treatment should be directed toward improving the dielectric state of the organs and their ionization. Contrary to Tschejevsky, who thinks that the decrease in the electric charge in the sick individual is due to an insufficient amount of ions present in the environment (and who consequently tries to increase the ion concentration of the environmental air to obtain therapeutic results), Parodi tries to explain this phenomenon on the basis of an impaired absorption of ions and an increase in their dispersion, caused by changes in the electric-chemical structure of the blood. Whereas Tschejevsky assumes that the ions penetrate into the body through the lungs, Parodi feels that the electric field of the blood and skin is important.—*Elettrobiogenesi e stati patologici. Storia dell'evoluzione del piano delle nostre ricerche, F. Parodi, Lotta contro la tuberc., 1942, 13: 87.*—(*G. Simmons*)

Blood-pressure and Respiration.—Following intravenous injection of acetylcholine and histamin in dogs an increase in the respiratory volume, associated with an increase in the alveolar oxygen and a decrease of the carbon dioxide tension, was noted. This action of acetylcholine is partly due to stimulation of the chemoreceptive organs located in the arch of the aorta and in the carotid sinus, while that of the histamin is simply due to a fall in blood-pressure.—*Blutdruck und Atmungsregulation, H. Loeschcke, K. Loose & W. Schoedel, Pfluegers Arch., 1941, 245: 210.* —(*G. Simmons*)

Oxygen Tension of Arterial Blood and Alveolar Air.—There is disagreement in the literature about the normal oxygen tension in human arterial blood. Studies were therefore done with a new method, which is described in detail. In 13 normal young adults at rest in semi-recumbent position an average arterial oxygen tension of 97.1 mm. Hg was found. Simultaneously collected alveolar air samples revealed an average oxygen pressure of 97.4 mm. Hg in end-expiratory samples. There was no difference between alveolar and arterial oxygen tension in healthy resting sub-

jects at sea level.—*The Oxygen Tension of Arterial Blood and Alveolar Air in Normal Human Subjects, J. H. Comroe, Jr. & R. D. Dripps, Jr., Am. J. Physiol., December, 1944, 142: 700.*—(*G. C. Leiner*)

Circulatory Effects of Gasps, Yawns and Sighs.—In dogs gross and net pressures were recorded from the right and left ventricles. (The net pressure is the gross pressure minus the intrathoracic pressure.) Normal inspiration increases venous return to the right heart and produces contour changes characteristic of larger and more prolonged effective ejection without significantly changing the duration of systole. In dying gasps, deep breathing, yawns and sighs, which are generally considered as respiratory acts, the venous return is markedly increased. In the presence of cardiac arrest, dying gasps pump blood through the lungs and temporarily provide blood flow to the vital areas, the central nervous system and heart. Effective net pressure as great as 50 mm. Hg in the pulmonary artery, 50 mm. Hg in the coronary arteries and 40 mm. Hg in the central nervous system arteries was created by dying gasps in dogs where cardiac action had ceased. —*Influence of Dying Gasps, Yawns and Sighs on Blood Pressure and Blood Flow, R. A. Woodbury & B. E. Abreu, Am. J. Physiol., December, 1944, 142: 721.*—(*G. C. Leiner*)

Intrathoracic Pressure and Circulation.—Cardiac output was measured by the direct Fick method and by a modification of Stewart's method in dogs breaking oxygen and air at a pressure of 8 and 16 cm. of water below atmospheric, 8 and 16 cm. of water above atmospheric, and at atmospheric pressure. The control cardiac output determinations made with the Fick method showed considerable variation, while the control determinations with the modified Stewart method showed little variation. The cardiac output determinations with the modified Stewart method showed that when air under a positive pressure of 16 cm. of water was breathed the cardiac output was decreased. The average decrease was 33 per cent of the control. When air under a negative pressure of 16 cm. was breathed there was little change in the cardiac output. Peripheral venous and right auricular pressures were measured simultaneously in dogs breathing air from a chamber in which the pressure varied from 20 cm. of water pressure above to 20 cm. below atmospheric pressure. When air under a positive pressure of 16 cm. of water was breathed the pressure fall from peripheral vein to right auricle was decreased. The average decrease was 72 per cent of the pressure fall when air under atmospheric pressure was breathed in one group of experiments and 64 per cent in another. When air under a negative pressure of 16 cm. of water was breathed the pressure fall from peripheral vein to right auricle increased. The average increase was 191 per cent of the control pressure fall in one group of experiments and 244 per cent in another. Since the cardiac output of the dog changes very little when air under a negative pressure of 16 cm. of water is breathed it would appear that the maintenance of a high peripheral venous pressure, when right auricular pressure is greatly decreased, is due to the fact that the veins become partially collapsed just before entering the chest and increase the resistance to the flow of blood to the right auricle. (Author's Summary).—*The Effect of Positive and Negative Intrathoracic Pressure on Cardiac Output and Venous Pressure in the Dog, J. P. Holt, Am. J. Physiol., November 1, 1944, 142: 594.*—(*G. C. Leiner*)